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position of the guard cells, the maximum diffusion capacity of the pore being seldom (if ever) utilized. A rhythmic variation in the transpiration rate was found to be independent of the stomatal rhythm. As to the latter, LLOYD finds that, aside from the indirect effect of high relative humidity in reducing the water loss and so favoring the opening of the stomata, there is no relation between the humidity and the position of the guard cells. He finds no closure of the stomata in anticipation of wilting, but during wilting a slow closure, without the preliminary opening attributed to them by FRANCIS DARWIN.

LLOYD also attacked an interesting problem in the supposed photosynthetic activity of the guard cells. He finds evidence of amyloplastic but none of chloroplastic activity, and concludes that the movements of the guard cells are related to their accumulation and dissolution of starch derived from the chlorenchyma, rather than to any photosynthetic products of the guard cells themselves.

This is a careful and thorough piece of work, highly creditable to the laboratory from which it comes. The experimental evidence is now at hand supporting conclusions which have been held by some physiologists for some years as highly probable on purely physical grounds.—C. R. B.

The timbers of commerce.—A second edition of BOULGER'S *Wood*, revised and enlarged, has appeared.[8] It deals with 1000 kinds of wood, and includes most of those known in general commerce. The first part (pp. 121) discusses wood in general, under such topics as origin, structure, development, classification, defects, selection, uses, supplies, and tests. The second part presents the woods of commerce, giving in each case the source, character, and use. The 48 plates are from photomicrographs of sections, and are intended to show the distinctive microscopic features. Such a book is encyclopedic, and therefore for its purpose it is extremely useful. The demand for a second edition speaks well for the favorable reception of the first.—J. M. C.

Knuth's Handbook.—The second volume of DAVIS' English translation of this encyclopedic work has just been issued by the Clarendon Press.[9] The original volumes and the first volume of the translation were reviewed in this journal,[10] so that the general scope and character of the work have been noted. The present volume includes observations on flower pollination made in Europe and in the arctic regions, and is a great mass of observations upon species ranging through the natural orders, from "Ranunculaceae to Stylidieae." Such a book cannot be reviewed, for it is an encyclopedia. It can only be announced, and this translation should greatly stimulate observation in a field too much neglected by American botanists.—J. M. C.

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[8] BOULGER, G. S., Wood, a manual of the natural history and industrial applications of the timbers of commerce. 8vo. pp. xi+348. *pls. 48.* London: Edward Arnold. 1908. $4.20.

[9] KNUTH, PAUL, Handbook of flower pollination. Translated by J. R. AINSWORTH DAVIS. Volume II. 8vo. pp. viii+703. *figs. 210.* Oxford: Clarendon Press. 1908. Half morocco 35*s.*; cloth 31*s.* 6*d.*

[10] BOT. GAZETTE **28**:280. 1899; **28**:432. 1899; **42**:494. 1906.

Flora of Manchuria.—KOMAROV[11] has completed his *Flora of Manchuria* with the appearance of the second part of the third volume. The whole work contains 853 pages, and the last part includes the Sympetalae from Labiatae to Compositae. It is interesting to note that in presenting 18 families, 130 genera, and 336 species, only two new species are described—one a Scutellaria, the other a Saussurea. An appendix contains descriptions of two new species of Anemone. In this part much the largest families are Compositae (164 spp.), Labiatae (48 spp.), and Scrophulariaceae (43 spp.)—J. M. C.

Grasses of Louisiana.—R. S. COCKS,[12] Tulane University, has published a list of the grasses of Louisiana, based upon collections made during each season since 1897. The catalogue contains 290 species, which is said to represent 12 per cent. of the flora of the state. It is interesting to note that 11 species are known to find their northern limit in Louisiana; 9 species their southern limit; 10 species their western limit; and 10 species their eastern limit; while 5 species are given as occurring only in Louisiana so far as the United States is concerned.—J. M. C.

The western willows.—JONES[13] has published an account of the western Salicaceae, recognizing 53 species of Salix, with numerous varieties, and 8 species of Populus. The species have been studied in the field and the descriptions are compact and clear; so that the willows are presented as they actually appear in nature. A key to the species makes their recognition very direct, and the characters used are very obvious ones. Willows have been difficult to identify, and this presentation should be of much service.—J. M. C.

North American Flora.—The second part of Volume IX concludes Polyporaceae, by W. A. MURRILL, 32 genera being presented, 16 of which have recently been described by the author. In various genera 36 new species are described.—J. M. C.

NOTES FOR STUDENTS

Biometrical studies.—The close interrelation between fluctuations and the environment, especially those factors of the environment which in any way affect nutrition, has been recognized by many authors and overlooked or ignored by others. Several valuable contributions have been made to this subject. In a

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[11] KOMAROV, V., Flora Manchuriae. Acta Hort. Petrop. 25^2:335–853. *pls. 4–16.* 1907.

[12] COCKS, R. S., Annotated catalogue of grasses growing without cultivation in Louisiana. Bull. 10. Gulf Biologic Station, Cameron, La.

[13] JONES, MARCUS E., The willow family of the Great Plateau. pp. 32. Salt Lake City, Utah.